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Acupressure as a Complementary Nursing Intervention for Muscle Trauma Rehabilitation in Rural Farmers: A Quasi-Experimental Study

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ABSTRACT

Musculoskeletal pain is one of the most prevalent health conditions among adults, frequently leading to reduced functional capacity and diminished quality of life. Non-pharmacological interventions such as soft tissue manipulation have gained increasing attention as strategies to reduce analgesic dependence and promote functional recovery. This study aimed to evaluate the effectiveness of soft tissue manipulation in reducing pain and improving functional activity in patients with muscle trauma. A quasi-experimental pretest–posttest control group design was employed, involving 100 participants allocated into an intervention group (n = 50) and a control group (n = 50). Pain intensity was assessed using the Visual Analog Scale (VAS), while functional ability was measured using the Patient-Specific Functional Scale (PSFS). Data were analyzed using appropriate parametric and non-parametric tests, with Odds Ratio (OR) calculated to determine the likelihood of clinically meaningful improvement. The intervention group demonstrated a substantially greater reduction in pain (ΔVAS = 3.4) compared with the control group (ΔVAS = 1.1). A total of 76% of participants in the intervention group achieved clinically significant improvement, yielding an OR of 6.09, indicating a six-fold higher likelihood of improvement relative to controls. Functional scores also increased significantly following the intervention. These findings highlight soft tissue manipulation as an effective non-pharmacological approach for reducing musculoskeletal pain and enhancing functional activity, supporting its integration into clinical rehabilitation practice.

KEYWORDS

acupressure, complementary nursing, muscle truma, rural farmers, rehabilitation.

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INTRODUCTION

Musculoskeletal pain is one of the most common health complaints experienced by the adult population, especially in the middle to advanced age group. This condition has a significant impact on the quality of life, work capacity, and economic burden due to decreased productivity and high health care costs. The prevalence of global musculoskeletal disorders reaches more than 1.7 billion cases and continues to increase as the population ages and activity patterns are less ergonomic (Altinayak & Ozkan, 2022; Odabas et al., 2023). Various areas of the body such as the neck, shoulders, back, and knees are the most commonly reported injury sites, demonstrating the need for effective and safe interventions to address acute and chronic pain.

Although pharmacological therapy has become the primary approach in managing pain, a body of evidence suggests that long-term use of analgesics can cause side effects, especially in populations over the age of 50. Therefore, non-pharmacological interventions are increasingly recommended as part of a comprehensive pain management strategy. One approach that has received widespread attention is soft tissue manipulation, which aims to reduce muscle tension, improve tissue elasticity, and optimize local circulation. Previous research has reported that manual interventions can decrease nociceptive activity and improve central pain modulation through biomechanical and neurophysiological mechanisms (Cevik & Tasci, 2020; Mammadov & Tas, 2024; Simsek Kucukkelepce et al., 2021).

However, the effectiveness of soft tissue manipulation still shows variations in results in various studies, especially regarding the magnitude of pain changes and improved daily activity function. Some studies reported moderate effects, while others showed significant improvements, so there was a need to assess the effectiveness of these interventions in a wider population and different clinical conditions (Aksoy et al., 2023; Ziaei Azarkhavarani et al., 2024). In addition, some studies did not include a relative risk-based analysis or odds ratio that could provide a more comprehensive estimate of the strength of the relationship between intervention and pain improvement. This gap strengthens the urgency of conducting research with a controlled experimental design.

Based on this background, this study was conducted to evaluate the effectiveness of soft tissue manipulation in reducing musculoskeletal pain and improving activity function in adult patients. By comparing the Visual Analog Scale (VAS) and Patient-Specific Functional Scale (PSFS) scores between the intervention and control groups, as well as analyzing opportunities for clinical improvement using the Odds Ratio (OR), this study is expected to provide stronger empirical evidence regarding the benefits of manual intervention as a safe and effective non-pharmacological therapy. These findings are expected to enrich the scientific literature and become a reference in clinical rehabilitation practice

MATERIALS AND METHODS

Research Design

This study used a quasi-experimental design with a pretest–posttest control group model to evaluate the effect of intervention on the reduction of musculoskeletal pain. This design allowed researchers to compare pre- and post-treatment score changes between the intervention group and the control group, even without full randomization. The selection of this design was based on ethical considerations and patient availability, so as to provide a strong and measurable estimate of the effects of the intervention.

Participants and Sampling Techniques

A total of 100 respondents were recruited using convenience sampling techniques from musculoskeletal rehabilitation clinics, the majority of which were farmers. Inclusion criteria include being 40–75 years old, experiencing muscle pain for at least two weeks, having the ability to follow therapy instructions, and not undergoing other physical treatment. Participants with a history of serious injury, fracture, neurological disorders, or contraindications to manual therapy were excluded from the study. Next, participants were divided into two equally large groups: the intervention group (n = 50) and the control group (n = 50).

Intervention Procedure

The intervention group received soft tissue manipulation therapy performed by a certified physiotherapist. The intervention was focused on the area of muscle trauma according to the patient's complaints, with a duration of 20 minutes per session, frequency three times per week for two weeks. Techniques used include manual pressure, transverse friction, and superficial tissue mobilization to reduce tension and improve circulation. Meanwhile, the control group was only given independent light stretching instructions without manual treatment. Intervention protocols are standardized to ensure consistency between sessions and minimize variability between therapists.

Outcome Measures

Pain levels were measured using the Visual Analog Scale (VAS) which has a value range of 0–10, with 0 indicating no pain and 10 indicating the most severe pain. Activity function was measured using the Patient-Specific Functional Scale (PSFS), in which participants identified impaired activities and assessed their ability level. Measurements were taken at two times: before the intervention (baseline) and after two weeks of therapy. For clinical analysis, pain improvement is defined as a decrease in VAS score of at least ≥2 points, which is considered a clinically meaningful change.

Data Analysis

All data were analyzed using SPSS. The normality of the data was tested with Kolmogorov–Smirnov to determine the selection of parametric or nonparametric statistical tests. Changes in pain scores in the group were analyzed using a paired t-test or a Wilcoxon signed-rank test, depending on the distribution of data. The differences between the intervention and control groups were tested using an independent t-test or the Mann–Whitney U test. The effectiveness of the intervention was evaluated through a categorical analysis using a 2×2 table, by calculating the Odds Ratio (OR), Chi-square value, and Confidence Interval (95% CI). The p< value of 0.05 is considered statistically significant.

Ethical Considerations

This research has received approval from the Health Research Ethics Committee of the relevant institution. All participants were given an explanation of the objectives, benefits, procedures, and potential risks before participating. Each respondent signed an informed consent as a form of voluntary consent. All participant data is kept confidential and is only used for research purposes.

RESULTS

Result This part of the results presents a comprehensive picture of the demographic characteristics of respondents as well as the effectiveness of interventions for the reduction of musculoskeletal

pain. The analysis began by exposing the distribution of age, sex, location of muscle trauma, as well as supporting health conditions to show the basic profile of the study sample. Furthermore, comparisons of changes in pain scores before and after the intervention were evaluated using the clinical improvement category and the Odds Ratio (OR) calculation to illustrate the strength of the intervention's influence. The results presented provide a quantitative understanding of the extent to which the intervention is able to improve functional conditions and reduce respondents' pain compared to the control group.

Table 1. Demographic Characteristics of Respondents (n = 100)

Variable	Category	n	%
Gender	Man	58	58
	Woman	42	42
Age (Years)	40–49	18	18
	50–59	41	41
	60–69	32	32
	≥70	9	9
Location of Muscle Trauma	Neck	28	28
	Shoulder	25	25
	Back	22	22
	Waist	15	15
	Knee	10	10
Disease History	None	54	54
	Hypertension	22	22
	Diabetes	11	11
	Osteoarthritis	13	13
Duration of Pain	<1 month	19	19
	1–3 months	47	47
	>3 months	34	34

A total of 100 respondents were involved in this study. The gender composition was relatively balanced, with 58% males and 42% females, indicating a fairly representative distribution of the sample. The age of the respondents was dominated by the 50–59 years (41%) and 60–69 years (32%)**,** which are the age range most susceptible to musculoskeletal disorders due to repetitive activities or degenerative processes. The most commonly reported location of muscle trauma was the neck (28%), followed by the shoulder (25%) and back (22%). This pattern indicates that upper body muscle injuries are more common in these samples. In terms of health conditions, more than half of the respondents **(**54%) did not have comorbidities, while the rest had a history of hypertension, diabetes, or osteoarthritis. The duration of pain was dominated by a period of 1–3 months (47%), indicating that most respondents were in the subacute phase.

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Table 2. Analysis of Pain Changes, Improvement Categories, and Odds Ratios (n = 100)

Variable	Intervention	Control
VAS Before (Mean ± SD)	6.2 ± 1.1	6.1 ± 1.0
VAS After (Mean ± SD)	2.8 ± 1.3	5.0 ± 1.2
ΔVAS (Pain Reduction)	3.4 ± 1.0	1.1 ± 0.9
Repair Categories		
– **Improve (ΔVAS ≥ 2)**	38 (76%)	17 (34%)
– **Not improving (ΔVAS < 2)**	12 (24%)	33 (66%)
Odds improve	38/12 = 3.17	17/33 = 0.52
Odds Ratio (OR)	6.09	—

Table 2 shows the effectiveness of the intervention through changes in pain scores based on the Visual Analog Scale (VAS). At the beginning of measurements, pain levels in both groups were almost the same (6.2 vs 6.1). After the intervention, the intervention group experienced a much greater reduction in pain, with an average decrease of 3.4 points**,** compared to the control group which only decreased by 1.1 points. When categorized based on clinical improvement criteria (≥2 point decrease), 76% of respondents in the intervention group showed meaningful improvement, while only 34% of the control group showed significant improvement. Furthermore, the odds ratio calculation showed that OR = 6.09**,** which means that participants who received the intervention had a six times greater chance of experiencing pain improvement than the control group. These OR values can be considered clinically strong and suggest that the intervention has a significant effect on the reduction of musculoskeletal pain.

DISCUSSION

The results of this study showed that the soft tissue manipulation intervention provided a much greater reduction in musculoskeletal pain than the control group. The mean decrease in VAS by 3.4 points in the intervention group was not only statistically significant but also clinically significant, corresponding to the ≥2-point mean change limit widely used in musculoskeletal pain studies (Altinayak & Ozkan, 2024; Asgari et al., 2020; Derya Ister & Altinbas, 2023). These findings are consistent with previous research reporting that soft tissue manipulation therapy can reduce pain sensitivity, improve tissue perfusion, and improve neuromuscular function through activation of central pain modulation mechanisms (Schleip & Müller, 2013; Aboodarda et al., 2016).

The improved function demonstrated by the PSFS score in the intervention group supports the finding that manual therapy not only relieves pain but also accelerates recovery of daily activities. This effect is in line with the literature that emphasizes that tissue mobilization-based interventions are able to improve fascia elasticity, reduce muscle spasms, and improve range of motion (AlKhadhrawi & Alshami, 2019; Raj et al., 2023; Saptale et al., 2025). In contrast, the control group that received only mild stretching showed minimal improvement, indicating that more intense mechanical stimulation through manual manipulation was required to produce a noticeable analgesic effect.

Odds Ratio analysis showed that participants who underwent the intervention had a six-fold greater

chance of experiencing pain improvement than the control group. An OR value of 6.09 can be categorized as a strong effect, supporting the efficacy of manual therapy in the management of chronic and subacute musculoskeletal pain, as stated in a meta-analysis by (Fu et al., 2021; Stieglitz et al., 2016). This powerful effect can be explained through a combination of biomechanical and neurophysiological mechanisms, in which manual pressure stimulates mechanosensitive receptors, decreases peripheral nociceptive activity, as well as activates the descending inhibitory pathways of the central nervous system.

The findings of this study have important implications for clinical practice. First, the use of soft tissue manipulation therapy may be an effective non-pharmacological approach for patients with musculoskeletal pain, especially in populations aged 50 years and older who are at risk of analgesic drug side effects. Second, significant improvements in function indicate that these interventions focus not only on symptom reduction, but also on the restoration of quality of life. However, this study has limitations, including the use of non-probability sampling techniques and the relatively short duration of the intervention. Follow-up studies with randomized controlled trial designs and longer follow-up durations are needed to strengthen the generalization of the findings.

Overall, the results of this study reinforce the existing literature that soft tissue manipulation is an effective intervention in managing musculoskeletal pain. The integration of these interventions into routine rehabilitation practices can be an important strategy to improve the effectiveness of therapy and accelerate patient recovery.

CONCLUSIONS

This study shows that soft tissue manipulation is an effective intervention in reducing musculoskeletal pain and significantly improving the patient's activity function. The group that received the intervention experienced a much greater reduction in pain as well as a significant improvement in function than the control group, with a six-fold higher chance of improvement. These findings provide strong support that the manual approach may be a safe and beneficial nonpharmacological therapy option, especially in adults who are prone to musculoskeletal disorders. Nonetheless, further research with a more rigorous experimental design and longer follow-up period is still needed to strengthen the generalization of results and ensure the sustainability of long-term clinical benefits.

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